

## HUMAN RESOURCES FOR TREATING NEW CANCER CASES IN CHILE

### Executive Summary

The purpose of this report is to describe the human resources needed in Chile to treat new cancer patients.

The population of Chile is approximately 16.8 million (8.31 million men and 8.49 million women) and the estimated number of new cancer cases in Chile for the year 2008, based on Globocan data for Chile as a whole (<http://globocan.iarc.fr/>) was 36047 (18441 in men and 17606 in women) (Table A). The five most common cancers in Chile are (1) urological (bladder, kidney, prostate and testis), (2) breast (3) stomach, (4) lung and (5) colorectal.

Table A: The ten most frequently occurring cancers in Chile for men and women based on 2008 Globocan data (<http://globocan.iarc.fr/>).

Cancer	Both	Rank	Men	Rank	Women	Rank
<b>All cancers excl. non-melanoma skin cancer</b>	<b>36047</b>		<b>18441</b>		<b>17606</b>	
Urological	7765	1	7067	1	698	9
Breast	4199	2			4199	1
Stomach	3762	3	2497	2	1265	5
Lung	2853	4	1783	3	1070	7
Colorectal	2737	5	1319	5	1418	4
Hematological Malignancies	2639	6	1377	4	1262	6
Gynecological	2432	7			2432	2
Gallbladder	2152	8	654	6	1498	3
Head and Neck	1264	9	533	8	731	8
Pancreas	1120	10	487	10	633	10
Esophagus	949	11	509	9	440	11

Newly diagnosed cancer patients need pathology, surgery, chemotherapy and/or radiation therapy. The number of oncologists needed is based, therefore, on the number of patients requiring pathology, surgery, chemotherapy and radiation therapy (Table B). This number is estimated from the percentage of patients requiring surgery, chemotherapy and/or radiation therapy for the top ten cancers in both men and women. For developing countries the International Atomic Energy Agency (IAEA) recommends training

Radiation/Clinical Oncologists who can prescribe both radiation and chemotherapy for the common solid cancers, instead of separate medical and radiation oncologists. Hematological malignancies are treated primarily by hematologist-oncologists. The number of specialists needed is based upon the number of cancer patients but each city, in order to ensure coverage if one person leaves or goes on vacation, must have at least 2 surgical oncologists, 2 radiation/clinical oncologists, 2 hematologist oncologists, etc.

Table B: Number of Oncologists needed for Chile's two most populous cities based on 2012 population estimates (<http://citypopulation.de/>) and 2008 Globocan data for new cancer cases (<http://globocan.iarc.fr/>).

	New Cancer Cases	Hematologist Oncologists	Surgical Oncologists	Radiation / Clinical Oncologists	Urologic Oncologists	Gynecologic Oncologists	Pathologists
<b>Metro region of Santiago</b>	<b>14339</b>	3	14	72	7	2	29
<b>Biobio</b>	<b>4216</b>	2 <sup>†</sup>	4	22	2	2 <sup>†</sup>	9

<sup>†</sup>At least 2 are needed in each city.

In addition to oncologists, support staff such as onco-pharmacists, pharmacy technicians, oncology nurses and palliative care specialists is also needed. Many cancer patients require hospitalization for diagnosis, treatment and/or complications, therefore an adequate number of oncology beds will be needed. The number of oncology nurses, onco-pharmacists and pharmacy technicians needed is based upon the number of beds occupied daily by cancer patients while the number of palliative care specialists is based on the number of new cancer cases per year (Table C). The oncology nursing staff for each 24-bed oncology unit (operating 24 hours a day, 7 days a week) comprises of one head nurse and a nurse specialist as well as 13 nurses working 8 hour shifts, 5 days per week.

Table C: Number of Oncology Units, Nursing and Pharmacy Staff needed for Chile's two most populous cities based on 2012 population estimates (<http://citypopulation.de/>) and 2008 Globocan data for new cancer cases (<http://globocan.iarc.fr/>).

	New Cancer Cases	Oncology Beds/Day	24 bed Oncology Wards	Onco-Pharmacists	Pharmacy Technicians	Palliative Care Specialists	Oncology Ward Nurses
<b>Metro region of Santiago</b>	14339	251	11	44	66	29	165
<b>Biobio</b>	4216	74	4	16	24	9	60

Since many cancer patients require radiotherapy, appropriately equipped facilities will be needed along with radiation oncology staff (Tables D and E). Radiation oncology staff includes radiation therapy technicians, medical physicists, Linac engineers and radiation oncology nurses in addition to radiation/clinical oncologists. The minimum radiation therapy equipment requirements are at least one of each: Linac, brachytherapy unit, CT simulator, treatment planning computer and dosimetry/quality assurance package.

Table D: Radiation Therapy Staff needed for Chile's two most populous cities based on 2012 population estimates (<http://citypopulation.de/>) and 2008 Globocan data for new cancer cases (<http://globocan.iarc.fr/>).

	New Cancer Cases	Radiation / Clinical Oncologists	Radiation Therapy Technicians	Medical Physicists	Linac Engineers	Radiation Oncology Nurses
<b>Metro region of Santiago</b>	<b>14339</b>	72	95	32	8	32
<b>Biobio</b>	<b>4216</b>	22	28	10	3	10

Table E: Radiation Therapy Equipment needed for Chile's two most populous cities based on 2012 population estimates (<http://citypopulation.de/>) and 2008 Globocan data for new cancer cases (<http://globocan.iarc.fr/>).

	New Cancer Cases	Linac / Co 60 Megavolt Units	Brachytherapy Units	CT Simulators	Treatment Planning Computers	Dosimetry /QA Packages
<b>Metro region of Santiago</b>	<b>14339</b>	16	8	8	8	8
<b>Biobio</b>	<b>4216</b>	5	3	3	3	3

**NOTE:** Guidelines from the IAEA of the United Nations were used to calculate the radiation therapy equipment and staff needed in the setting of a developing country. Guidelines from the Oncology Nursing Society were used to calculate the number of nurses needed. Several other specialty societies were also requested to provide guidelines but in most cases there were none, therefore colleagues active in those fields were consulted for estimating the number of staff needed.